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Residual V-to-I in Faroese and its lack in Danish: detecting the final stages of a syntactic change^{*}

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Abstract

In Heycock et al. (2010a) it was shown that V-to-I in contemporary Faroese has much lower acceptability than might be expected from a number of descriptions in the literature. Given that it was also argued that Faroese has a relatively free distribution of embedded V2 (EV2), it might be concluded that all putative instances of V-to-I in the language can be attributable to EV2. Here we demonstrate, however, that the judgments on clear cases of EV2 and on possible cases of V-to-I differ subtly but measurably, showing that the loss of V-to-I in this language has not yet gone entirely to completion. We further demonstrate that the situation in Faroese contrasts with that in Danish, as expected under the assumption that V-Neg orders in subordinate clauses in Danish are entirely attributable to EV2, as argued in e.g. Vikner (1995).

1 Introduction

The loss of V-to-I in Faroese has been a topic of considerable interest and debate in the syntactic literature over the last two decades. We will not attempt to summarise the literature here (see Heycock et al. 2010a for an overview), but some recent results point to Faroese being at the very tail end of this syntactic change (Bentzen et al. 2009, Heycock et al. 2010a). In fact, Heycock et al. (2010a) present data showing that at least in relative

^{*}The work reported here was supported by a grant from the Arts and Humanities Research Council awarded to Heycock and Sorace. We are grateful to Frans Gregersen and Lena Wienecke Andersen for their help in recruiting participants for the Danish study.

clauses—a context where V2 is generally disallowed—Faroese speakers display a preference for keeping the verb below negation that is quantitatively indistinguishable from the same preference among Danish speakers. From this it might be concluded that the change in Faroese is not just in its final stages, but has gone to completion, as concluded in Vikner (1995) and Petersen (2000) at least for younger speakers (approximately, those born after 1960).

If Faroese has in fact completely lost V-to-I at this point, any residual acceptance or sporadic production of the V–Neg order in subordinate clauses would most naturally and economically be attributable to the possibility of embedded V2 (EV2). Heycock et al. (2010a) show that Faroese allows adjunct-initial V2 orders in subordinate clauses rather more freely than Danish; any acceptance of V–Neg orders in such contexts could then potentially be assimilated to V2, the typical assumption for a language like Danish. In this paper we seek to establish precisely whether V–Neg orders in Faroese pattern together with, and hence can be taken to be instances of, clear cases of EV2.

To do this, we take advantage of the fact that even in Faroese, EV2 is not equally acceptable in all subordinate contexts. We establish the extent of the dispreference for EV2 orders in three different clause types by comparing the acceptability of adjunct-initial and subject-initial orders in these clause types. We then compare this to the dispreference for V–Neg order with respect to Neg–V order in these same contexts. If V–Neg order were uniformly treated as the result of V-to-I, there should be no effect of clause type. On the other hand, if V–Neg order at this stage of the language is only acceptable to the extent that it is a case of V2, we expect that clause type should have exactly the same effect on the acceptability of the V–Neg variant as it does on the adjunct-initial variant. As we will see, it turns out that clause type does have an effect on the grammaticality of V–Neg orders in Faroese; but to a significantly lesser extent than is the case for the clear (adjunct-initial) cases of EV2. We interpret this result as evidence that speakers still have access to a grammar with V-to-I, despite a strong preference for keeping the verb in a low position.

An alternative explanation might of course be that subject-initial V2 (detectable only by the position of the verb with respect to elements like negation) and non-subject-initial V2 (of which our adjunct-initial cases are one example) might not in fact be exactly equivalent, and that this difference is responsible for the contrast between the V–Neg judgments and the adjunct-initial judgments observed in Faroese. In order to rule out this pos-

sibility, we conduct a parallel investigation of Danish, a language in which, by hypothesis, only (some form of) V2 can yield V–Neg orders. It turns out that in Danish the patterns of judgments on V–Neg are indistinguishable from those on the adjunct-initial order. This provides evidence against deriving the difference in Faroese from a distinction between subtypes of V2; and also adds to our understanding of the phenomenon of embedded V2 more generally.

2 Comparing V-to-I with V2 in Faroese

2.1 Methodology

2.1.1 Magnitude Estimation

The judgment data reported here were gathered using the methodology of Magnitude Estimation (ME). The application of ME to grammaticality judgment tasks is described in Bard et al. (1996), and more recently Keller (2000), Featherston (2005), Sprouse (2007), Sorace (to appear), Bader & Häussler (2010). Subjects are asked to assess the ‘goodness’ of sentences, presented in sequence—in this it is just like other more widely-used methods of obtaining grammaticality judgments. However, unlike most other protocols for gathering such judgments, subjects are explicitly asked to give relative, rather than absolute judgments. That is, they are asked to compare sentences and state how much better or worse each sentence is relative to some other sentence, in a proportional way—that is, how many times better or worse. Also, in contrast to most other protocols, no limit is placed on the number of discriminations that can be made; that is, subjects are not asked to make a binary choice or even to place sentences on a two-point, three-point, or 15-point scale; rather they are encouraged to make as many discriminations as they feel capable of.

The ME procedure for linguistic acceptability is analogous to the standard procedure used to elicit judgments for physical stimuli. Subjects are required to assign numbers to a series of linguistic stimuli proportional to the degree of acceptability of the stimuli as they perceive it. First, subjects are exposed to a modulus item, to which they assign an arbitrary number. Then, all other stimuli are rated proportional to the modulus (and hence to each other); for example, if a sentence is three times as acceptable as the modulus, it should receive a number that is three times as large as the modulus number. How the modulus itself is chosen varies from study to study, and also whether the subjects continue to see the modulus as they proceed

from one sentence to another. In this study the modulus was selected at random for each subject, and did not remain on screen.

Each subject can choose their own scale, although they are encouraged to use as wide a range of numbers as possible. Because of this the scores have to be normalised. This can be done in various ways: in this study the scores for each subject were converted to z-scores (which indicate how far and in what direction the original score differs from the mean for that speaker, expressed in terms of the standard deviation of the score for that speaker).¹

2.1.2 Design

In order to quantify the effect of clause-type on the acceptability in Faroese of uncontroversial cases of EV2 on the one hand, and V–Neg orders on the other, we made clause-type a variable with three values. Subjects were presented with three types of subordinate clauses: declarative complements to *siga* ‘say,’ declarative complements to *nokta* ‘deny,’ and interrogative complements to *spyrja* ‘ask.’ It is generally known that EV2 is most acceptable in the first of these contexts and least acceptable in the last, with the second having a status somewhere between the two; see Heycock et al. (2010a) for a more extensive discussion of EV2 in Faroese.

To determine the effect of these contexts on uncontroversial instances of EV2, in each of these three contexts subjects were presented with clauses that had either subject-initial order or adjunct-initial order. As in Heycock et al. (2010a) we chose examples with fronted adjuncts to exemplify non-subject-initial V2 rather than examples with fronted arguments, because the latter typically require a discourse context involving some kind of contrast with the fronted argument (see Jónsson 1996 and Hrafnbjargarson & Wiklund 2010 for differences between argument-initial and adjunct-initial EV2). The examples were presented without context.

For V–Neg, in the three contexts participants were presented with clauses that had either negation–verb or verb–negation order.

Thus the design was 3x2x2. To make this clearer, examples of all 12 conditions are given in (1)–(3); the full list of examples is available from the authors.

- Clause type:
 - declarative complement of *say*

¹ In addition to normalising the scores by using z-scores, the original scores were first converted into logs, to correct for the skew that follows from asking for proportional judgments (Keller 2000).

- declarative complement of *deny*
 - interrogative complement of *ask*
 - Indicator of verb position (Inversion Type)
 - subject
 - negation
 - Verb position:
 - high (between an initial adjunct and the subject, or, in a negative sentence, between the subject and the negative marker *ikki*)
 - low (after the subject²; in a negative sentence, after the negative marker)
- (1) a. Beinir segði, at hann hevði verið leingi til arbeiðis
Beinir said that he had been long at work
 í gjárvøldið.
yesterday evening
 Beinir said that he had been at work late last night.
 SAY-COMPLEMENT; SUBJECT; LOW-VERB
- b. Katrin segði, at í gjárvøldið hevði hon sæð hundin
Katrin said that last night had she seen dog.DEF
 beintuttanfyri.
directly outside
 Katrin said that last night she had seen the dog just outside.
 SAY-COMPLEMENT; SUBJECT; HIGH-VERB
- c. Næmingarnir siga, at teir ikki hava lisið hasa bókina
students.DEF say that they NEG have read that book.DEF
 áður.
before
 The students say that they haven't read that book before.
 SAY-COMPLEMENT; NEGATION; LOW-VERB
- d. Lív segði, at hon var ikki komin seint til arbeiðis
Lív said that she was NEG come late to work
 í gjár.
yesterday
 Lív said that she hadn't got to work late yesterday.
 SAY-COMPLEMENT; NEGATION; HIGH-VERB

²As will be clear from the examples below, in a subject-initial clause with no negative marker or medial adverb, the position of the verb is actually ambiguous; the point however is that in such a sentence there is a possible parse that has the verb in a low position.

- (2) a. Teir ákærdu noktaðu, at teir hövdu smuglað rúsevni
those accused denied that they had smuggled drugs
inn í landið sjóvegis.
into country.DEF by sea
The defendants denied that they had smuggled drugs into the
country by sea.
DENY-COMPLEMENT; SUBJECT; LOW-VERB
- b. Jákup noktaði, at í gjárvöldið hevði hann verið á
Jákup denied that last night had he been in
vertshúsinum.
pub.DEF
Jákup denied that last night he had been in the pub.
DENY-COMPLEMENT; SUBJECT; HIGH-VERB
- c. Skiparin noktaði, at hann ikki hevði givið røtt
skipper.DEF denied that he NEG had given correct
veiðitøl upp síðsta túr.
fish numbers up last outing
The skipper denied that he hadn't declared the correct catch
for the last voyage.
DENY-COMPLEMENT; NEGATION; LOW-VERB
- d. Janus noktaði, at hann hevði ikki sitið íbundin á
Janus denied that he had NEG sat belted in in
baksetrinum.
back seat.DEF
Janus denied that he hadn't put on his seatbelt while in the
back seat.
DENY-COMPLEMENT; NEGATION; HIGH-VERB
- (3) a. Lærarin spurdi, um hon hevði verið í Íslandi og
teacher.DEF asked if she had been to Iceland and
ferðast í summer.
travelled in summer
The teacher asked if she had been travelling in Iceland in the
summer.
ASK-COMPLEMENT; SUBJECT; LOW-VERB
- b. Vikarurin spurdi, um hinar tímarnar hövdu tey
supply teacher.DEF asked if those hours had they
órógvað líka illa sum henda.
disturbed equally badly as this
The supply teacher asked if in the other classes they had be-

haved as badly as this.

ASK-COMPLEMENT; SUBJECT; HIGH-VERB

- c. Lærarin spurdi, um teir ikki høvdu verið í grind
teacher.DEF asked if they NEG had been to whale kill
 í gjár
yesterday
 The teacher asked if they hadn't been at the whale kill yesterday.

ASK-COMPLEMENT; NEGATION; LOW-VERB

- d. Venjarin spurdi, um teir høvdu ikki sæð
trainer.DEF asked if they had NEG seen
 sjónvarpsdystin í gjárvøldið.
television match last night
 The trainer asked if they hadn't seen the match on television last night.

ASK-COMPLEMENT; NEGATION; HIGH-VERB

Note that in all cases the finite verb in the complement clause is either auxiliary *hava* 'have' or *vera* 'be;' this is to ensure that there is no doubt about the placement of the negative marker *ikki*.³ The subject of the complement clause is always a pronoun. Platzack (1988) argued that in the history of Swedish, "V3" orders (with the finite verb lower than negation or sentence-medial adverbs) are more common with pronominal subjects than with full noun phrase subjects. In order to avoid any possible confound all of our examples have only one type of subject.⁴

There were three example sentences for each condition, resulting in a total of 36 test sentences. These were combined with 18 sentences from two other experiments, and 25 other fillers of varying grammaticality, so in all each participant judged 79 sentences.

³By making the finite verb uniformly *hava* or *vera* in auxiliary use, we also avoid any confound arising from the differential placement of auxiliaries and main verbs with respect to negation. Children acquiring Faroese appear to make such a distinction (Heycock et al. 2010b) and there is some evidence that adults may as well (Bentzen et al. 2009); we intend to investigate this further in a separate study.

⁴Platzack argued that in Old Swedish pronominal subjects may cliticize to the complementizer, leaving the subject position empty, a structure which allows for stylistic fronting of the negative marker or adverb. If such stylistic fronting takes place the result is a V3 order. In contemporary Faroese however there is no evidence of any such cliticization, and stylistic fronting is much less common than it was in Old Swedish; we therefore consistently used pronominal subjects as this allowed us to restrict the length and complexity of the example sentences.

2.1.3 Subjects

The sentences were judged by 50 native speakers of Faroese, grouped into three age groups (18–30, 40–55, and 65 and over). In each age group there were approximately equal numbers of men and women.

2.1.4 Procedure

The sentences were presented using the web program WebExp2 (Keller et al. 1998, 2009). All the Faroese participants did the experiment in the presence of Zakaris Svabo Hansen. The presentation began with an introduction to the idea of giving proportional judgments through a trial session involving line length; this was followed by a trial session of linguistic judgments before the sentences that comprised the experiment were presented, in a random order that was different for each participant. Sentences were presented one at a time on screen, with no opportunity to go back to earlier decisions.

2.2 Results

As discussed earlier, we are interested in the effect of clause type on clear cases of V2 and on cases that are potentially ambiguous between V2 and V-to-I. We expect that declarative complements to *say* will allow V2, and hence adjunct-initial order, relatively freely. We also expect that this order may be slightly more restricted in declarative complements to *deny*, and much more restricted in interrogative complements to *ask* (examples like (1b), (2b), (3b)). The corresponding subject-initial examples (as in (1a), (2a), (3a)) are predicted to be fully grammatical. Nevertheless, since the verbs *nokta* ‘deny’ and *spyrja* ‘ask’ are likely to be lower frequency than *siga* ‘say,’ and may also differ in semantic and pragmatic complexity, there may be effects of clause type regardless of the word order within the complement.⁵ This of course we are not interested in here. In order to abstract away from this, for each participant we calculated the difference between the judgment scores for the subject-initial and adjunct-initial examples. Similarly, in order to look at whether clause type has an effect on the V–Neg order we calculated the difference between the judgment scores for the V–Neg order (as in examples (1d), (2d), (3d)) and those for the corresponding examples with Neg–V order (as in (1c), (2c), (3c)). In all cases

⁵In particular, the combination of the inherently negative verb *deny* with a negated complement, as in (2c) and (2d), is expected to present difficulties in processing.

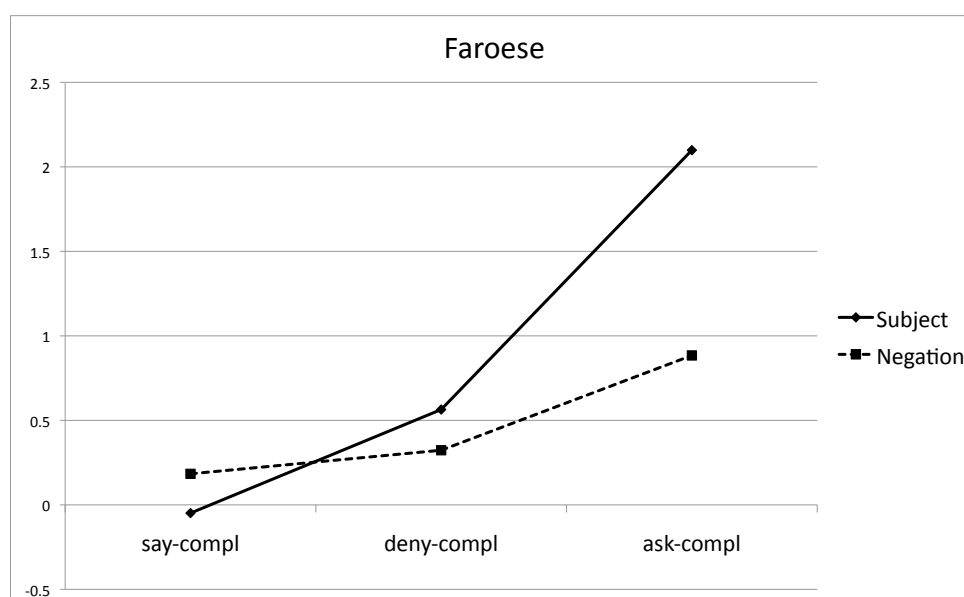


Figure 1: Faroese: the effect of verb position in different clause types

we subtract the score for the “high verb” condition from the “low verb” condition. If both orders are judged equally acceptable, the difference will be zero. The higher the score above zero, the greater the preference for the “low verb” order over the corresponding “high verb” order. A score below zero would indicate a preference for the “high verb” order over the corresponding “low verb” order.

The difference in scores between the two word orders in the different clause types are shown in Figure 1. The dashed line shows the degree of preference for the Neg–Verb over the Verb–Neg order (clauses where the position of the verb is shown by its order with respect to negation), the solid line the preference for the subject-initial over the adjunct-initial order (clauses where the position of the verb is shown by its order with respect to the subject).

These results are for all the Faroese participants, in all three age groups. Based on the literature, we had expected differences between the three groups. Specifically, we had expected that older participants would be more likely than younger participants to accept the Verb–Neg order in clause types where V2 is excluded or dispreferred. In terms of this experiment, this would mean an interaction between Age and Clause Type. However, The ANOVA shows no main effect of age, and no interactions of age with any of the variables in this experiment.⁶

⁶An ANOVA (Analysis of Variance) is used to analyse data sets in which there is more than one condition (independent variable), and shows how the independent variables affect the dependent variable (how the sentences are rated), i.e. whether there is a difference between conditions, and how the conditions interact

Turning to the linguistic variables: as the graph suggests, there is a main effect of Clause Type ($F(2,94)=138.42$, $p<0.001$) and also a main effect of Inversion Type (inversion of the verb with negation or with the subject) ($F(1,47)=46.74$, $p<0.001$). Recall that a score of zero represents no difference between the judgments on sentences with the verb in a “high” or “low” position. As we would expect, in the complement of *siga* ‘say’ (a verb known to allow V2 very freely in its complements in Faroese, as do the corresponding verbs in the other Germanic languages), there is essentially no difference in the judgments of examples with subject-verb inversion and those without. That is, examples like (1b) and (1a) are judged to be equally acceptable. For clauses containing an instance of negation, there is also only a very weak preference for the verb remaining in a “low” position (that is, for examples like (1c) over (1d)). The finding that there is a main effect of Inversion Type means that overall the preference for the “low” position of the verb with respect to the subject (that is, the preference for subject-initial as opposed to adjunct-initial word order) is not the same as the preference for the low position of the verb with respect to negation (that is, the preference for Neg–Verb as opposed to Verb–Neg order). Inspection of the graph suggests that it is the greater dispreference for subject-verb inversion (adjunct-initial order) over no inversion (subject-initial order) in the complements to *nokta* ‘deny’ and *spyrja* ‘ask’ that is responsible for this effect.

The finding that there is a main effect of Clause Type means that overall clause type has an effect on the difference between the judgment of “high” versus “low” placement of the verb. On its own this is not a very meaningful result for us. It is expected that clause type should have an effect on the preference for examples with no subject-verb inversion (the solid line in the graph), and that is indeed what we see here. The “main effect” of clause type however also includes the effect on the preference for Neg–Verb over Verb–Neg order (the dashed line). The graph suggests that there is a similar effect of clause type here as well (the preference for Neg–Verb over Verb–Neg seems possibly greater in complements to *nokta* ‘deny’ than in complements to *siga* ‘say,’ and clearly greatest of all in interrogative complements to *spyrja* ‘ask’). But the question that we are really interested in is whether the effect is the *same* in both cases. That is to say, are judgments on the Verb–Neg order affected by Clause Type to the same extent as judgments on the Adjunct–Verb–Subject order? To

with each other in their effect on the dependent variable. An ANOVA uses the means and variances of the dependent variable in different conditions to calculate whether these differences and interactions are significant. Field (2005) is a good introduction.

determine this, we need to know whether there is an interaction between the effect of Clause Type and the effect of Inversion Type. That is, are the dotted and solid line effectively parallel or not? The answer is that there is an interaction: ($F(1,47)=35.08$, $p<0.001$). The two lines are not parallel.

From the graph it is clear that overall the interaction is due to a greater effect of Clause Type on the preference for uninverted (subject-initial) clauses over those with subject-verb inversion (adjunct-initial) than on the preference for Neg–Verb over Verb–Neg order (the solid line rises more steeply than the dotted line). From the ANOVA, however, we cannot be sure whether this is all due to the large separation between the two cases in interrogative complements to *say*, or whether the difference in the slopes between complements to *sigā* ‘say’ and complements to *nokta* ‘deny’ is also significant.

Partly in order to answer this question, and also in order to make sure that our results were as robust as possible, we additionally conducted an analysis using Mixed Modelling (see e.g. Baayen 2008). Initially we ran a global model with factors Clause Type, Inversion Type, and Age. This confirmed the results of the ANOVA reported above: there was no significant effect of Age, and no significant interaction between age and any of the linguistic variables. There was a significant effect of Clause Type ($t=-5.825$, $p<0.001$) and approaching significance of inversion Type ($t=1.932$, $p=0.054$), and a significant interaction of Clause Type with Inversion ($t=-2.782$, $p<0.01$; $t=-8.507$, $p<0.001$).

In order to pinpoint where nonsubject-initial clauses behaved differently to Verb–Neg clauses, we then split this global model into two smaller models, the first comparing the effect of complements to *sigā* ‘say’ with complements to *nokta* ‘deny,’ and the second comparing the effect of complements to *sigā* with interrogative complements to *spyrja* ‘ask.’ For the first of these two models—comparing complements of *sigā* ‘say’ to complements of *nokta* ‘deny’—there was a significant main effect of Clause Type ($t=-5.541$, $p<0.001$) and an interaction of Clause Type and Inversion Type ($t=-3.486$, $p<0.001$). For the second model—comparing complements of *sigā* ‘say’ to interrogative complements of *spyrja* ‘ask,’ there were significant main effects of Clause Type ($t=-15.815$, $p<0.001$), Inversion Type ($t=-5.454$, $p<0.001$), and a significant interaction of Clause Type and Inversion Type ($t=-8.035$). Additionally, in this model there was a significant main effect of Age ($t=2.061$, $p<0.05$), such that as age increases, the difference between acceptability ratings for high and low verbs decreases. That both nonsubject-initial and Verb–Neg clauses are more

strongly dispreferred in interrogative complements than in complements to *sigá* ‘say’ is unsurprising, but the existence of the main effect and interaction in the first submodel—the one comparing complements to *sigá* ‘say’ to complements of *nokta* ‘deny’—shows that although the difference between the way nonsubject-initial orders are treated in these contexts and the way Verb–Neg orders are treated may not be so great, it is nevertheless real.

2.3 Discussion

The results of this experiment replicate those of the comparison reported in Heycock et al. 2010a in showing that in Faroese, nonsubject-initial V2 is very freely accepted in declarative complements to *sigá* ‘say,’ while it is largely rejected in interrogative complements to *spyrja* ‘ask.’ While in the earlier study we found that nonsubject-initial V2 was accepted as freely in complements to declarative complements to *ivast um* ‘doubt,’ *nokta* ‘deny,’ and *vera stoltur av* ‘to be proud of’ taken as a group, as it was in complements to *sigá* ‘say,’ however, here we found that the nonsubject-initial order was slightly worse after *deny* than it was after *say*.

Most interestingly for us here, however, is the finding that while clause-type has an effect also on the grammaticality of V–Neg as opposed to Neg–V orders, the effect is significantly weaker, both in *deny*-complements and for *ask*-complements. This is unexpected if V–Neg order can now only arise in Faroese as an instance of V2; if this were the case we would expect the effect to be the same, since there would only be a single underlying phenomenon. This difference between V–Neg orders and nonsubject-initial orders then suggests that V-to-I is not completely lost even in contemporary Faroese, but that speakers still have it as a—heavily dispreferred—option in their grammars. Note that all the instances of “V-to-I” here involve the negative marker *ikki*, rather than a sentence-medial adverb. In Heycock et al. (2010a) it was shown that Faroese speakers are more willing to have the verb precede certain medial adverbs than to allow it to precede negation; thus suggesting that Faroese may have here the same grammatical settings as some of the Regional Northern Norwegian dialects (Bentzen 2005, Bentzen et al. 2009). However, Bentzen reports that in these dialects movement of the verb across negation is fully ungrammatical, while here we are seeing that this movement is still marginally available to speakers.

It should be noted that the one instance that we found of an effect of age (the greater dispreference for high verb position among younger speakers compared to the older group) is in the direction that is expected given that

we know the historical trend is the loss of V-to-I. However, what we would really expect if the older speakers were behind in this change would be an *interaction* of age with clause type and polarity, rather than a main effect. That is to say, since EV2 is available to speakers of all grammars in the complement to *sigá* ‘say,’ speakers who more freely allow V-to-I would not be expected to differ from younger speakers here; rather the difference should show up in negative contexts only, and disproportionately in the context that most disfavors EV2: interrogative complements. The evidence for a generational difference in these data, therefore, is very weak. While this was unexpected given the literature on this change, our other investigations of judgments of related constructions in Faroese have also so far failed to show clear evidence of generational difference (and see also Bentzen et al. 2009). However, it is well-known that linguistic change follows an “S-shaped curve” (Bailey 1973, Kroch 1989); hence, as a change goes to completion, the rate of change slows. It is therefore expected that generational differences will be less marked toward the end of a change; our result here suggests that Faroese is at this very late stage, where the curve has flattened out, but that the change has not yet gone fully to completion.

The conclusion that our results here show that Faroese speakers still have V-to-I as a dispreferred option, however, relies on the assumption that subject-initial V2 (only detectable in an SVO V2 language by the position of the finite verb with respect to negation and medial adverbs) and adjunct-initial V2 are entirely equivalent, an assumption that is not unassailable.⁷ On a “truncation” analysis of the restrictions on embedded V2—one in which V2 does not occur in certain embedded clauses because these have a less elaborated set of clausal projections and hence fewer positions for an XP and the finite verb to move to—it could be proposed that even when the verb moves to a position above negation but below the subject the subject is still in a lower position than that occupied by a sentence-initial adjunct—that is, that the subject in an example like (2d) is in a lower position than the adverbial *í gjárkvøldið* ‘last night’ in (2b). This would then open the possibility that a verb might select for a complement that could include the projection hosting a moved subject, but not the projection required for a sentence-initial adjunct. It should be said, however, that we are not aware of any clear cases of such a distribution, at least within Germanic; observe

⁷Perhaps surprisingly, while Vikner (1995) argues that V–Neg orders in both Danish and Faroese are the result of the same kind of V2 that gives rise to adjunct-initial order, his data from Danish suggest that there is at least in some cases in Danish a difference in judgments—but in the opposite direction to what we observe for Faroese (Vikner 1995, p. 125).

also that even in Faroese the subject-initial V–Neg complements are better than the adjunct initial complements in *deny* and *ask* complements, but that they are still degraded. Alternatively, under the kind of analysis of embedded topicalization advanced in Haegeman (2007, 2010), according to which the restrictions are due to an intervention effect, one could hypothesize that the features responsible for subject-movement are distinct from those that attract the adverbial and that only the latter create an intervention effect (again though the degraded status of the relevant examples in Faroese and the absence of any other attested clear case of this distribution would remain to be explained).

In order to rule out the possibility that the difference between the adjunct-initial and the V–Neg clauses in Faroese is due to some distinction between two different types of V2, we decided to run a parallel experiment on Danish; this is described in the next section.

3 Comparing V-to-I with V2 in Danish

3.1 Rationale

Danish is known to have lost V-to-I around 1500–1700, and its absence from the standard language and at least most dialects is uncontroversial. It is therefore equally uncontroversial that the possibility of V–Neg orders in subordinate clauses is due to V2; this is argued in detail in Vikner (1995). Danish is thus an ideal minimal comparison to Faroese that can allow us to determine empirically whether V–Neg orders arising unambiguously from V2 in embedded contexts are judged in the same way as adjunct-initial orders.

3.2 Design

The structure of the experiment was identical to that just described for Faroese. All the materials and the other instructions were translated into Danish, making changes only where necessary to make the examples more natural, either in terms of idiomatic use of language or cultural references. The largest number of changes were in fact in the ungrammatical fillers, since in Faroese these often contained inappropriate case or agreement morphology which has no counterpart in Danish. The full list of examples is available from the authors; here we give one example of each of the test conditions, corresponding to the Faroese cases in (1)–(3).

- (4) a. Sten sagde at han havde været længe på arbejde
Sten said that he had been long at work
 i går aftes
yesterday evening
 Sten said that he had been at work late last night.
 SAY-COMPLEMENT; SUBJECT; LOW-VERB
- b. Katrine sagde at i går aftes havde hun set hunden
Katrine said that last night had she seen dog.DEF
 lige udenfor.
directly outside
 Katrine said that last night she had seen the dog just outside.
 SAY-COMPLEMENT; SUBJECT; HIGH-VERB
- c. Eleverne siger at de ikke har læst den bog.
students.DEF say that they NEG have read that book
 The students say that they haven't read that book.
 SAY-COMPLEMENT; NEGATION; LOW-VERB
- d. Maren sagde at hun var ikke kommet for sent på arbejde
Maren said that she was NEG come late to work
 i går.
yesterday
 Maren said that she hadn't got to work late yesterday.
 SAY-COMPLEMENT; NEGATION; HIGH-VERB
- (5) a. De anklagede nægtede at de havde smuglet narkotika
those accused denied that they had smuggled drugs
 ind i landet i en turistbus.
into country.DEF in a tour bus
 The defendants denied that they had smuggled drugs into the
 country in a tour bus.
 DENY-COMPLEMENT; SUBJECT; LOW-VERB
- b. Brian nægtede at i går aftes havde han været på værtshus.
Brian denied that last night had he been in pub
 Brian denied that last night he had been in the pub.
 DENY-COMPLEMENT; SUBJECT; HIGH-VERB
- c. Kaptajnen nægtede at han ikke havde opgivet korrekte
captain.DEF denied that he NEG had given correct
 fangsttal efter sidste fisketur.
catch numbers after last fishing trip
 The skipper denied that he hadn't declared the correct catch
 for the last voyage.

DENY-COMPLEMENT; NEGATION; LOW-VERB

- d. Jens nægtede at han havde ikke haft sikkerhedssele på.
Jens denied that he had NEG had seat belt on.
 Jens denied that he hadn't had his seat belt on.

DENY-COMPLEMENT; NEGATION; HIGH-VERB

- (6) a. Læreren spurgte om hun havde været på ferie i
teacher.DEF asked if she had been on holiday to
 Norge sidste sommer.
Norway last summer
 The teacher asked if she had been on holiday in Norway in the summer.

ASK-COMPLEMENT; SUBJECT; LOW-VERB

- b. Vikaren spurgte om de andre timer havde de
supply teacher.DEF asked if the other hours had they
 forstyrret lige så meget som den her.
disturbed equally so much as this
 The supply teacher asked if in the other classes they had behaved as badly as this.

ASK-COMPLEMENT; SUBJECT; HIGH-VERB

- c. Læreren spurgte om de ikke havde været til
teacher.DEF asked if they NEG had been to
 byfest i går aftes.
village party last night
 The teacher asked if they hadn't been at the local festival last night.

ASK-COMPLEMENT; NEGATION; LOW-VERB

- d. Træneren spurgte om de havde ikke set kampen i
trainer.DEF asked if they had NEG seen match.DEF on
 fjernsynet i går aftes
television.DEF last night
 The trainer asked if they hadn't seen the match on television last night.

ASK-COMPLEMENT; NEGATION; HIGH-VERB

3.3 Subjects and procedure

As with the Faroese version, the Danish experiment was run using Web-Exp2. However, we did not have the opportunity to meet with the Danish participants, who instead completed the experiment online. A total of 31

native speakers of Danish did the experiment, but the results from one participant were not included in the analysis as this person used a high number of '0' scores and a very narrow range, contra the instructions. Most of the participants were university students at the University of Aarhus, but an additional 8 were recruited through other contacts. The ages of the participants ranged from 19 to 63, with a mean of 28, and a median of 24; there were 20 females and 10 males. As we had no expectation that there would be generational differences in the Danish speakers (and had found none in the Faroese speakers) we did not group the participants into age groups. However, in order to check whether or not age had any effect, we included Age as a covariate.

3.4 Results

Again duplicating our procedures for the Faroese version, for each participant we calculated the difference between the judgment scores for the subject-initial and adjunct-initial examples. Similarly, in order to look at whether clause type has an effect on the V–Neg order we calculated the difference between the judgment scores for the V–Neg order (as in examples (4d), (5d), (6d)) and those for the corresponding examples with Neg–V order (as in (4c), (5c), (6c)). Again, in all cases we subtract the score for the “high verb” condition from the “low verb” condition. If both orders are judged equally acceptable, the difference will be zero; a higher score indicates a greater preference for the “low verb” order over the corresponding “high verb” order.

The difference in scores between the two word orders in the different clause types is shown in Figure 2. The dotted line shows the degree of preference for the Neg–Verb over the Verb–Neg order, the solid line the preference for the subject-initial over the adjunct-initial order.

We included age as a covariate in the ANOVA analysis; there was no main effect of age, and no interactions of age with any of the within-subjects variables.

As the graph suggests, there was a significant main effect of Clause Type ($F(2,56)=12.291$, $p<0.001$). In contrast to Faroese, however, there was no significant main effect of Inversion Type, and there was no significant interaction between Inversion Type and Clause Type.

We did the same analyses using Mixed Modelling as we had for Faroese. We initially ran a global model with factors Clause Type, Inversion Type, and Age. The results are consistent with the ANOVA: there was a significant effect of Clause Type ($t=8.063$, $p<0.001$), but no effect of Inversion

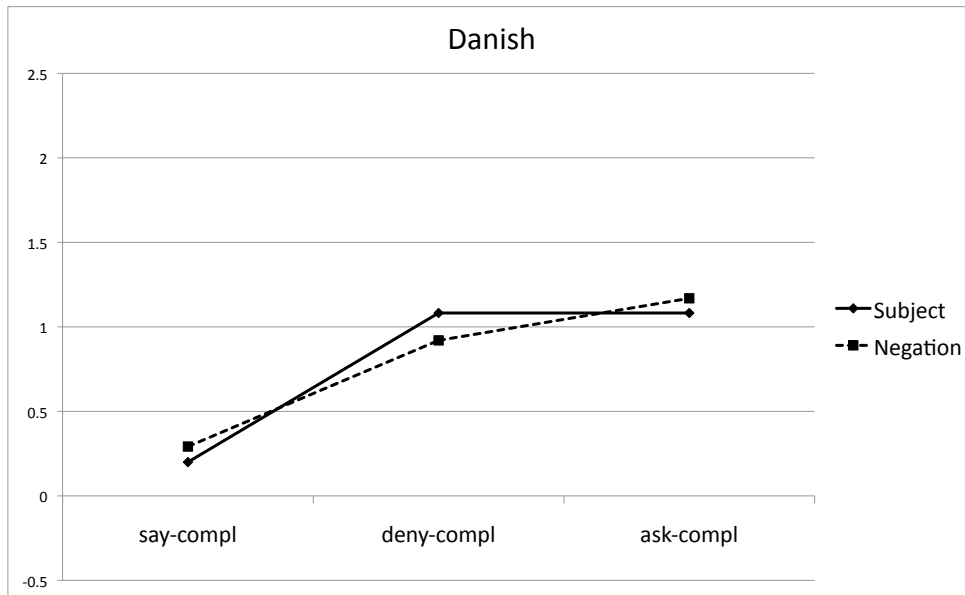


Figure 2: Danish: the effect of verb position in different clause types

Type, and no interaction of Clause Type with Polarity .

We then constructed two submodels, the first comparing complements of *sige* ‘say’ to complements of *nægte* ‘deny,’ and the second comparing complements of *sige* to complements of *spørge* ‘ask.’ In both cases there was a main effect of Clause Type ($t=6.054$, $p<0.001$) (the preference for “low verb” orders was greater after *nægte* and after *spørge* than after *sige*), but there was no main effect of Inversion Type. That is to say, overall, the preference for adjunct-initial orders over subject-initial orders was the same as the preference for Neg–Verb orders over Verb–Neg orders. There was also no interaction between Clause Type and Inversion Type: the greater dispreference for adjunct-initial orders over subject-initial orders in the complements of *nægte* and *spørge* was the same as the greater dispreference for Verb–Neg orders over Neg–Verb orders in these clause types.

3.5 Discussion

The first difference between Faroese and Danish that may be noted from visual inspection of the two sets of graphs is that in Faroese the major break in the acceptability of EV2 is between the complements to the negative verb ‘deny’ and the interrogative complements to ‘ask,’ while in Danish the major break is between the complements to ‘say’ and the other two complement types. This result provides further confirmation of the conclusion in Heycock et al. (2010a) that Faroese (and Icelandic) differ from Danish in the availability of EV2 in “non-bridge” declarative contexts, contra

suggestions in Wiklund et al. (2009)⁸.

The crucial difference for the main point of this paper, however, is that in Danish, unlike Faroese, the effect of V2—as evidenced by the dispreference for nonsubject-initial compared to subject-initial orders—is identical to the effect of moving the verb over negation—as evidenced by the dispreference for V–Neg orders compared to Neg–V orders. Thus in Danish we see that the judgments of these two phenomena are exactly as predicted by theories which treat them as having the same derivation (Vikner 1995). Recall that this was not the case in Faroese: as shown in the graph in Figure 1, in Faroese the judgments on the V–Neg order are intermediate between what would be expected if V-to-I were freely available and what would be expected if V2 were the only derivation to yield the V–Neg order. The results from Danish therefore provide empirical evidence to back up our interpretation of the Faroese results as involving a residue of V-to-I in that language. That is, they provide justification for treating the difference in the judgments between nonsubject-initial orders and V–Neg orders in Faroese as evidence for the continuing availability of a different derivation for the V–Neg order; the best explanation being the persistence of the option of V-to-I alongside V2.

4 Comparison with production

Given that these results from grammaticality judgments indicate that the loss of V-to-I has not yet gone to completion in Faroese, in contrast to Danish, we would expect to find a difference between the two languages also in production. Unfortunately there are as yet only limited corpora for Faroese. In order to investigate production at least in a preliminary way we did a search for negated subordinate clauses in the *Corpuseye* corpus of Faroese (<http://corp.hum.sdu.dk/cqp.fo.html>; Eckhard Bick, Heini Justinussen, Zakaris Svabo Hansen, Trond Trosterud, Tino Didriksen), which consists of approximately 112,000 words from the 2004 edition of the *Sosialurin* newspaper and an additional 94,000 words from the Faroese edition of *wikipedia*. We also searched in the transcriptions of 22 interviews carried out and transcribed by Jógvan í Lon Jacobsen (approximately 289,000 words). The negative marker *ikki* was searched for, and then the instances occurring in subordinate clauses were hand-selected and coded for different clause type and context. To provide the comparison with Dan-

⁸It should be noted that Wiklund et al. do hedge their conclusions with respect to Faroese by mentioning the possibility that their findings might be restricted to one dialect of the language.

Type of clause	Faroese		Danish	
	V-Neg	Neg-V	V-Neg	Neg-V
Decl	74 (41%)	106 (59%)	1 (1%)	105 (99%)
Result	10 (91%)	1 (9%)	2 (100%)	0 (0%)
ConsDeg	6 (35%)	11 (65%)	0 (0%)	4 (100%)
Cause	21 (95%)	1 (5%)	4 (18%)	18 (82%)
Adv	1 (4%)	27 (96%)	0 (0%)	50 (100%)
IndQu	0 (0%)	13 (100%)	0 (0%)	4 (100%)
Rel	1 (2%)	64 (98%)	0 (0%)	96 (100%)
Cond	0 (0%)	17 (100%)	0 (0%)	32 (100%)
Total	113 (32%)	240 (68%)	7 (2%)	309 (98%)

Table 1: V-Neg and Neg-V order in subordinate clauses in Faroese and Danish newspapers

ish, a comparable search was done in a subsection of the Corpuseye data from the 2004–2008 editions of the Danish newspaper *Information*. Table 1 summarises the most direct comparison: the total of 353 clauses from the Faroese newspaper *Sosialurin* and the first 316 from the Danish newspaper *Information*.

The clause types in which negation appeared are categorized for the purposes of this summary as follows:

Decl: declarative subordinate clauses introduced either by the complementizer *at* ‘that’ or by a null complementiser. This categorization includes complements to verbs, adjectives, and nouns, whether extraposed or not.

Result: result clauses introduced by *so (at)* ‘so (that)’.

ConsDeg: “consequence of degree” clauses.⁹ Declarative clauses in the construction ‘so Adj (that) ...’ These cases were considered separately as they are known to have root-like properties in a number of the Germanic languages (Heycock 2006, Julien 2007, 2009).

Cause: adverbial clauses introduced by Faroese *tí (at)* ‘because (that)’ or Danish *for* and *fordi* ‘because’.¹⁰

⁹Elsewhere we have referred to these clauses as “extent” clauses, but we here adopt the more perspicuous terminology of Julien (2007, 2009).

¹⁰Danish *for* and *fordi* should really be considered separately. In the data from *Information* there were 4

Adv: other adverbial clauses (e.g. those introduced by Faroese *tá ið* ‘when’ or *hóast* ‘although.’)

Rel: relative clauses¹¹

Cond: conditional clauses

Although the overall distribution of the V–Neg and Neg–V order looks very different in the two languages (32% V–Neg in Faroese, 2% V–Neg in Danish), most of this is due to the difference in the declarative complement clauses (‘Decl’ in the summary table). This is of course the type of clause in which EV2 is most frequent, however. In order to make a direct comparison with the judgment data, we would like to be able to separate out complements to the verbs that were studied in the judgment task (*nokta/nægte* ‘deny’) or at least verbs in the same semantic class. Unfortunately, however, it turns out that these verbs do not occur frequently—at least not with negation in their complement clauses: we found no examples in either the Faroese or the Danish data from the newspapers, and in fact even when we add the additional 383,000 words in the *wikipedia* text and the spoken dialogues to the 112,000 word *Sosialurin* data, the situation does not change. Thus a corpus of just under half a million words is not sufficient to give us a single relevant example of negation in this type of “non-bridge” context.

The other clause type that we looked at in the judgment task, indirect questions, does yield some relevant examples, but not many: 13 in the Faroese newspaper text and 4 in the Danish. In both languages these examples all had Neg–Verb order. Again we can try adding the other Faroese data: the results from the *Sosialurin*, *wikipedia*, and interview data added together are given in Table 2.

In this larger data set we have 21 examples of indirect questions, but still no examples of the V–Neg order. There is one example, from the speech of the interviewer in the interviews, in which the negative *ikki* does follow the finite verb: this is given in (7).

clauses introduced by *for*, all of which had Verb–Neg order; there were 18 clauses introduced by *fordi*, all of which had the opposite, Neg–Verb order. This suggests that Danish, like a number of other languages, has distinct complementizers for ‘central’ and ‘peripheral’ expressions of causality, the latter taking complements with root-like properties. However, as this is not the focus of the discussion here, we have put them together for simplicity.

¹¹ In the initial coding, relatives with the gap in subject position were coded separately from other relatives, since in this case the Neg–Verb order is potentially ambiguous between a derivation with a low verb and a derivation where the high placement of negation is due to stylistic fronting. However, as the results in the data were essentially categorical in both contexts, these two environments have been grouped together in the summary.

Type of clause	V-Neg	Neg-V
Decl	161 (42%)	224
Result	19 (83%)	4
ConsDeg	15 (50%)	15
Cause	92 (70%)	40
Adv	2 (2%)	91
IndQu	0 (0%)	21
Rel	4 (2%)	238
Cond	4 (2%)	167
Total	297 (27%)	800

Table 2: V-Neg and Neg-V order in *Sosialurin*, *wikipedia*, and interview transcriptions

- (7) Hvat tú sjálf heldur um tín færleika í enskum, um tú
what you self think about your competence in English if you
 tosar hann als ekki ella raðið
speak it at all NEG or fluently
 What you yourself think of your competence in English, if you
 speak it not at all or fluently.¹²

We did not count (7) as an example of V–Neg order because although the modified negative *als ekki* can appear in medial position, it is here coordinated with the manner adverb *raðið*, which cannot. Presumably as a result, the coordinated phrase *als ekki ella raðið* ‘not at all or fluently’ cannot appear in medial position (before the finite verb); the two phrases also cannot be separated, with *als ekki* before the verb and *raðið* after it. Thus we have to conclude that the coordinated structure is in VP-final position (as in the English translation).

For completeness, we give all the 10 examples of V–Neg order in a non-V2 environment below:

Adverbial clauses:

- (8) Tað var akkurát, sum um man bleiv ekki ordiligani
it was just as if one became NEG really

¹²The pronoun masculine pronoun *hann* is unexpected given that it refers back to the neuter word *enskt* ‘english,’ this seems to have been a production error, possibly due to the influence of masculine *forleiki* ‘competence.’

involveraður ...

involved

It was just as though one didn't get really involved ...

Source: Interview

- (9) Hann gekk niðaneftir, sum hann og fólk eru von at ganga
he went up as he and people were used to walk
 millum bygda, tá ið tað eru ikki neyðsynjarørindi.
between villages when it were NEG urgent errands
 He walked up, as he and others used to walk between the villages,
 when there were no urgent errands.
 Source: *Sosialurin*

Relative clauses:

- (10) tað verður nógv brúkt altso, sum er slett yvirhøvur
it becomes much used thus which is completely totally
 ikki føroyskt altso ...
 NEG *Faroese thus*
 So it gets used a lot, which is really not Faroese at all ...
 Source: Interview
- (11) Tað blívur ræðuliga nógv sovorðið orð brúkt sum eru
it becomes very many such words used which are
 slett yvirhøvur ikki føroyskt
completely totally NEG Faroese
 There are very many words like that used, which are really not
 Faroese at all.
 Source: Interview, same speaker as (10)
- (12) Eitt ella annað sum onkur ikki skilti ella visti ikki og
one or another that noone NEG understood or knew NEG and
 sovorðið, tað irriteraði meg grensuleyst, ha?
such it irritated me boundlessly PRT
 Something or other than one didn't understand or didn't know or
 suchlike, that irritated me beyond measure, right?
 Source: Interview
- (13) Og stuttligt var, at lagt varð fyri við rútmustykki,
and enjoyable was that begun became for with rhythmic piece
 ið minti ikki sørt um Safri Duo
that reminded NEG little of Safri Duo
 And what was enjoyable was that they started by playing a rhyth-

mic piece that was quite reminiscent of Safri Duo.

Source: *Sosialurin*

Conditional clauses:

- (14) altso tað verður kanska eitt glopp ímillum har ja, kanska
so it becomes perhaps a gap between there yes perhaps
 um man fer ekki at forstanda hvønnannan
if one goes NEG to understand each other
 So there is something missing perhaps if you end up not understanding each other
 Source: Interview
- (15) altso viss eg føli meg ekki so sterkan í sponsum ...
so if I feel REFL NEG so strong in Spanish
 so if I consider myself not so strong in Spanish
 Source: Interview
- (16) men eg haldi at tað er gott at duga, at skilja
but I think that it is good to be able to understand
 norðurlandskt fyri tað um vit høvdu ekki verið ein partur av
Scandinavian for that if we had NEG been a part of
 Danmark
Denmark
 But I think it is good to be able to, to understand Scandinavian even if we weren't a part of Denmark.
- (17) Síðani 2003 hefur verið möguligt at ganga ígjøgnum tunnulin
since 2003 has been possible to walk through tunnel.DEF
 (um tað er ekki gloymt at hava ein lykt) ...
if it is NEG forgotten to have a torch
 Since 2003 it has been possible to walk through the tunnel (if you don't forget to bring a torch).¹³
 Source: wikipedia

Looking at these examples it seems that some should be viewed with a certain degree of caution. Of the relative clauses, two—(10) and (11)—involve the pattern *copula*–NEG–*adverb(s)*–*adjective*; there is therefore a potential parse as constituent negation of the AP, as in an English example like *That would be completely and totally not English* (cf. Iatridou 1990).

¹³The noun *lykt* (light) is feminine so the accusative form of the article should be *eina*; the masculine form *ein* is in the original text as found in the Corpuseye data.

(12) has a coordination, with Neg–V order in the first disjunct and V–Neg order in the second; as is discussed in (Thráinsson et al. 2004, p. 193) *ella* can sometimes behave more like an adverbial itself, inducing subject-verb inversion (see also Faarlund 2004 on this phenomenon in Old Norse). The final example of V–Neg in a relative clause involves the idiom *ikki sørt* which might therefore also suggest that this is constituent negation; however, speakers report that it is possible to have the negation precede the verb also in this case, showing that the construction is not in fact frozen.

Of the four conditional clauses, (14) should perhaps be excluded as the position of the negation is ambiguous—in infinitives in Faroese the negative marker precedes *at*, so the negation could be preverbal in the infinitive clause rather than postverbal in the finite. However, native speakers report that they interpret this sentence as involving matrix negation, hence we have included it in the count. The example in (15) is another possible case of constituent negation of the following AP.

The percentages of V–Neg order in Faroese in Tables 1 and 2 are therefore possibly higher than they should be. But even if we take them as they are, these distributions themselves would provide only extremely weak evidence for concluding that Faroese and Danish differ at all in the availability of V-to-I in subordinate contexts; the percentages are too close to zero to exclude the possibility that these are just errors, particularly given the small Ns (where 5% can be due to a single example).

What we are observing here in the contrast between the judgment data and the corpus/production data fits with the more general pattern discussed most recently in Bader & Häussler (2010), who show that while in some cases corpus frequency can be shown to correlate with perceived acceptability, there is both a ceiling effect with judgments and—most relevantly for us here—a floor effect with frequency:

- (18) a. *Ceiling Mismatch*
 When perceived well-formedness is at ceiling, two syntactic structures may differ in terms of frequency despite being perceived as equally well-formed.
- b. *Floor Mismatch*
 If frequency is at floor, two syntactic structures may differ in terms of perceived well-formedness despite both occurring with zero or near-zero frequency.
 (*Bader & Häussler 2010, p. 316: (20)*)

While the cases that were discussed in Bader & Häussler (2010) all concern

differences in frequency or grammaticality between variants in a single language, what we observe in our data is the same effect between two languages (and, necessarily, two sets of speakers): V-to-I in Danish and V-to-I in Faroese are both at or near “floor” with respect to frequency, but they nevertheless differ in their perceived well-formedness.¹⁴

5 Conclusion

The data from the judgment tasks in Faroese and Danish reported here reinforce the conclusion in Heycock et al. (2010a) that embedded verb second has a wider distribution in Faroese than it does in Danish. Further, and more importantly, a quantitative comparison between judgments on adjunct-initial subordinate clauses (unambiguous cases of verb second) and subject-initial clauses with Verb–Negation order (potentially ambiguous between verb second and V-to-I) shows that while Danish behaves exactly as predicted by the hypothesis that Verb–Negation orders in this language are due entirely to embedded verb second, Faroese does not: the acceptability of Verb–Negation is consistently higher than predicted by such a hypothesis. From this we conclude that although contemporary Faroese speakers all show a strong preference for the “new,” mainland-Scandinavian-like order, V-to-I remains an option within their grammatical system. Noting that this preference seems to be as strong for speakers over 65 as for speakers in their 20s, we have hypothesized that while the loss of V-to-I has not gone to completion in Faroese, the language is currently at the very tail of the “S-shaped curve” that characterises replacement of one variant by another, so that the rate of change is now very slow. Comparing the results of the judgment tasks to the evidence from frequency of production (online corpora of Faroese and Danish and a collection of transcribed conversations in Faroese), we have seen that unambiguous cases of V-to-I seem to be as low-frequency in Faroese as in Danish. This contrast

¹⁴It is of course striking that there is such a marked difference between Faroese and Danish in the “ambiguous” contexts given in the first four rows of Tables 1 and 2—those in which V2 is possible (in both Faroese and Danish) but not obligatory. A similar result—a relatively high frequency of V–Neg order in Faroese and its almost categorical absence in Danish—was also reported in Heycock et al. (2003), for a comparison between the first ten chapters of a popular novel translated into Faroese and Danish. It is certainly tempting to view the high frequency of the V–Neg order in Faroese in such contexts as due to there being two possible sources—the order certainly could arise from V2, but there is also a V-to-I derivation available. However, it is important to bear in mind that embedded V2 in Danish is known to be subject to genre/style effects, and perhaps even prescriptive norms; the rate of V–Neg in declarative complement clauses is much higher in the spoken language than in written texts (Garbacz 2005). This is not obviously true of modern Faroese. Hence we cannot ignore the possibility that at least some of the difference between Danish and Faroese in the rate of V–Neg orders in written texts has to do with different prescriptive norms.

between frequency data and judgment data, we have argued, is part of a widely-attested phenomenon; one methodological conclusion therefore is that cases such as the one at hand, where a change is in a very late stage, are better investigated through grammaticality judgments than through frequency counts in corpora.

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